

Laparoscopic Marsupialization of a Giant Posttraumatic Splenic Cyst

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ABSTRACT

Background and Objective: Nonparasitic cysts are rare clinical lesions of the spleen. Causes include congenital malformations and trauma. Historically, management has entailed partial or total splenectomy using an open approach. Recently, laparoscopic approaches have been developed. In this report, we describe laparoscopic marsupialization of a giant splenic cyst (diameter > 15 cm).

Methods: A 25-year-old African-American man presented with a 9-month history of early satiety, constipation, and left upper quadrant pain. Additionally, he reported blunt trauma to the abdomen 2 years earlier. Physical examination revealed a large, fixed, nontender left upper quadrant mass. Computed tomography scan confirmed a simple cyst within the spleen, measuring 20 x 25 cm. *Echinococcus* and *Entamoeba histolytica* serologies were negative. Laparoscopic exploration was performed. Four liters of brown fluid were aspirated and intraoperative cytology confirmed a nonparasitic cyst. The cyst wall was excised and the cavity was packed with omentum.

Results: The patient's recovery was uneventful, and he was discharged to home tolerating a regular diet on postoperative day 3. At 6-month follow-up, the patient was asymptomatic and showed no evidence of recurrence.

Conclusion: Nonparasitic splenic cysts are rare lesions. Laparoscopic marsupialization is safe and effective for giant nonparasitic splenic cysts and should be considered the treatment of choice.

Key Words: Nonparasitic splenic cyst, Laparoscopic marsupialization, Laparoscopic surgery, Spleen.

INTRODUCTION

Splenic cysts are rare lesions and should be suspected when a mass is noted in the left upper quadrant. The traditional classification divides them into "true" cysts (primary) and pseudocysts (secondary) on the basis of the presence or absence of an epithelial lining. Primary cysts can be subdivided into those with parasitic and those with nonparasitic causes. Secondary cysts are usually seen following abdominal trauma and are thought to be a late complication of an intrasplenic hematoma. Such cysts may become quite large, and cysts greater than 15 cm in size are considered giant.¹

Formerly, the treatment of choice for secondary cysts consisted of total splenectomy via an open approach.^{2,3} However, due to the small, but real, risk of overwhelming postsplenectomy sepsis (OPSI), spleen-sparing techniques have been developed.⁴ Additionally, advances in minimally invasive surgery have resulted in effective treatment with less morbidity. Although laparoscopic hemisplenectomy has been reported, most nonparasitic splenic cysts (NPSC) may be unroofed, or marsupialized, with good results.^{3,5} In this paper, we present a case in which a giant splenic cyst was successfully treated by laparoscopic marsupialization.

CASE REPORT

A 25-year-old African-American male presented with a 9-month history of early satiety, constipation, and left upper quadrant abdominal pain. The patient reported that 1 year prior to presentation he was involved in a motor vehicle collision without apparent injury. He also reported blunt trauma to the abdomen during an altercation 2 years earlier.

Physical examination revealed a large firm, fixed, nontender, left upper quadrant mass (**Figures 1 and 2**); the rest of the physical examination was unremarkable. A computed tomography (CT) scan of the abdomen confirmed a single splenic cyst measuring 20 x 25 cm, exerting a significant mass effect on the surrounding organs (**Figure 3**). As seen on the CT scan, the stomach, duodenum, and pancreas were displaced medially, and the left kidney was compressed posteriorly. Serologies for *Echinococcus*

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Figure 1. Anterior view of patient's abdomen before surgery, showing an obvious mass in the left upper quadrant.

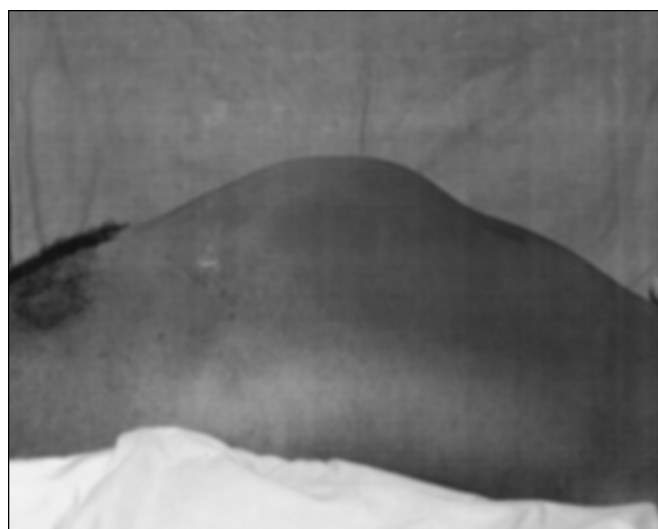


Figure 2. Lateral view of patient's abdomen before surgery, showing a large protrusion anteriorly in the abdominal wall.

and *Entamoeba histolytica* were negative. Because of the symptoms and size of the cyst, surgery was recommended, and the patient agreed to proceed. Preoperatively, *pneumococcal*, *haemophilus influenzae*, and *meningococcal* vaccines were administered.

After induction of general anesthesia, the patient was placed in the supine position. After establishing pneumoperitoneum, a 30° laparoscope was inserted through an umbilical port. The abdomen was explored, and a giant splenic cyst was identified (**Figure 4**). The mass displaced

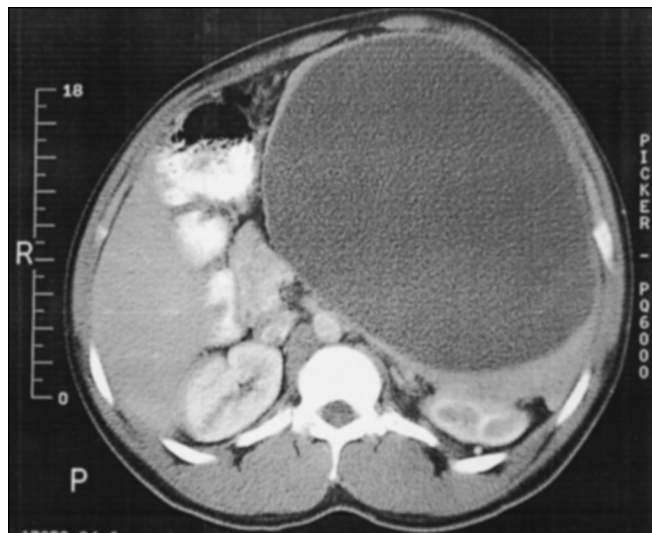


Figure 3. Computed tomography scan of the abdomen showing the cyst and its mass effect on the surrounding structures. A small rim of splenic tissue can be seen at the posterior aspect of the cyst.

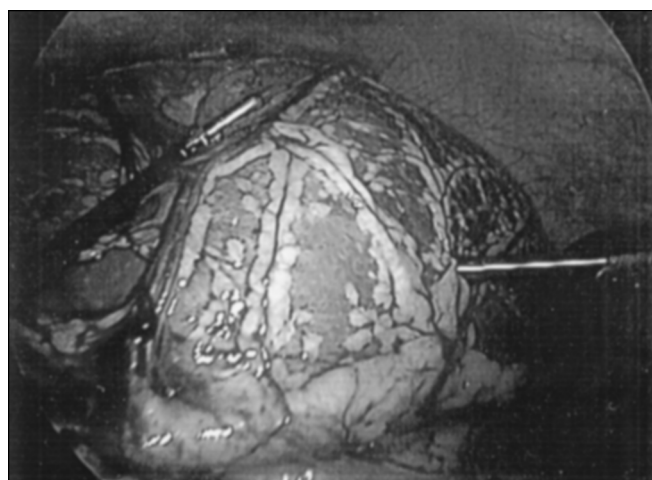


Figure 4. Laparoscopic view of the giant splenic cyst with a thin covering of omentum. An aspiration needle was inserted for decompression.

the transverse colon inferiorly, and large varices were noted in the gastrocolic ligament due to venous compression. Two additional 10-mm trocars were placed in the left and right lower abdominal quadrants. A sample of fluid was aspirated from the cyst to confirm the diagnosis. The fluid was dark brown in color, and cytologic examination showed no ova, cysts or parasites, no malignant cells, and abundant hemosiderin-laden macrophages, consistent with trauma. Four liters of fluid were removed before the cyst was completely decompressed. The cyst was then

widely unroofed by excising the entire anterior wall using the Harmonic scalpel (Ethicon Endo-Surgery, Cincinnati, OH). Two additional 5-mm ports were placed in the upper abdomen to facilitate cyst wall excision near the diaphragm. The wall thickness varied from several millimeters to well over a centimeter in some places. Bleeding was generally controlled with the Harmonic scalpel, but suture ligation of larger vessels using the Endostich device (United States Surgical Corporation, Norwalk, CT) was required in several places. After unroofing, the trabecular cyst lining was visualized and debris was removed (**Figure 5**); thus, complete marsupialization was achieved. Although the omentum had been stretched thin by the mass effect from the cyst, sufficient omentum was available to pack the cavity and obliterate the dead space (**Figure 6**). Several sutures were used to hold the omentum in place. The cyst wall was placed in a specimen bag and retrieved through a 10-mm port site in a piecemeal fashion.

Gross pathologic examination showed a dark brown cyst lining and hemorrhagic debris (**Figure 7**). Microscopic evaluation confirmed a benign cyst wall with abundant hemorrhage and hemosiderin-laden macrophages. In most of the cyst wall, no epithelium could be identified; but in a small area, a mesothelial lining was found (**Figure 8**). The operation was completed in 3 hours, and the patient was discharged to home on the third postoperative day. At 6-month follow-up, the patient was free of symptoms and showed no signs of recurrence.

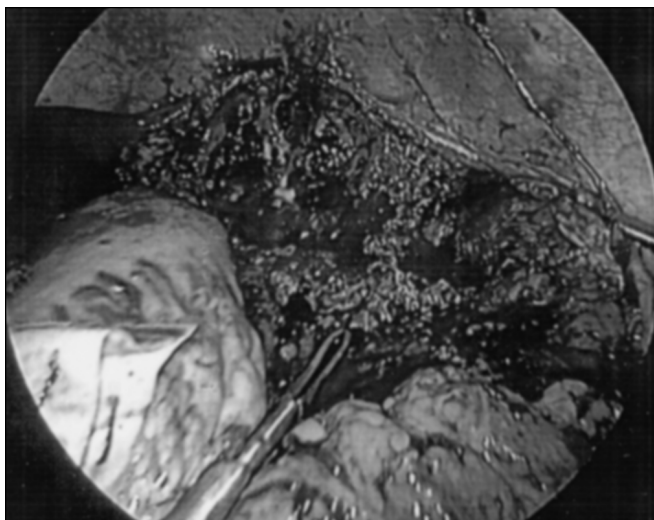


Figure 5. Laparoscopic view of the cystic cavity and debris.

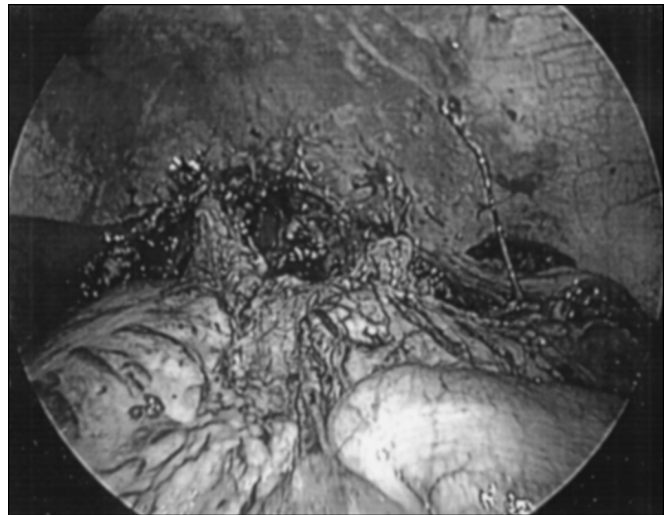


Figure 6. Laparoscopic view of the unroofed cyst with omental packing.



Figure 7. Fragments of the cyst wall after specimen retrieval.

DISCUSSION

In 1790, Berthelot described the first echinococcal splenic cyst, and in 1829, Andral described the first NPSC.⁶ Since then, approximately 800 cases of NPSC have been reported, and a recent increase has occurred in the incidence of posttraumatic cysts.⁷

Several classifications for splenic cysts exist. The most widely adopted is that of McClure and Altemeier,⁸ which is a modification from the first classification published by

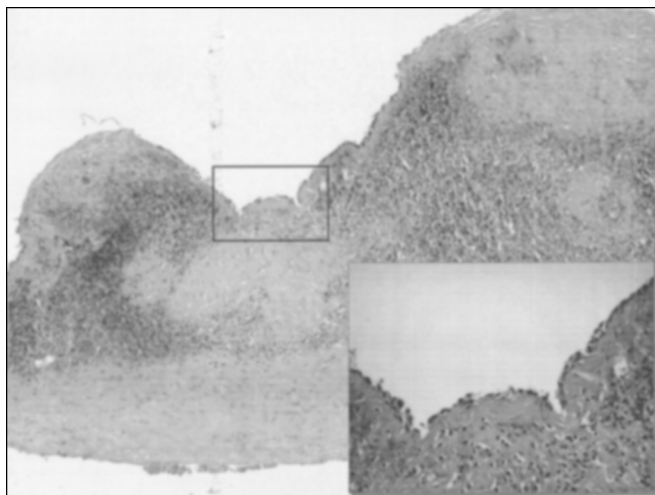


Figure 8. Microscopic view of the cyst wall with identification of a segment of mesothelial lining (inset).

Fowler in 1912,⁹ and divides splenic cysts into 2 groups. A specific secreting membrane lines primary or true cysts. The lining may be epithelial, endothelial, or parasitic. *Echinococcus* is the most common parasitic cause, and most other primary cysts are congenital. False or secondary cysts do not have a secreting lining and may be serous, inflammatory, degenerative, or hemorrhagic. Blunt abdominal trauma with occult injury of the spleen is the most common cause for secondary cysts.

Morgenstern¹ has recently questioned the validity of the traditional classification criteria for NPSC. On microscopic examination, Morgenstern was able to identify an epithelial lining and concluded that most NPSCs are congenital in nature, regardless of a history of trauma. Therefore, Morgenstern recommended that according to cause alone, cysts should be classified as congenital, neoplastic, traumatic, or degenerative. Although our patient clearly had a posttraumatic cyst, a mesothelial lining was identified in a portion of the cyst wall, which is consistent with Morgenstern's findings.

Abdominal trauma is responsible for approximately 75% of secondary splenic cysts.⁷ Although a history of trauma can be elicited in only 30% of the patients, a traumatic cause can be confirmed grossly by the presence of shaggy, hemorrhagic debris, and microscopically by hemosiderin-laden macrophages.^{1,10} Posttraumatic cysts are formed either by encapsulation of a hematoma or by infoliation of splenic capsule fragments.¹¹ Posttraumatic splenic cysts are asymptomatic in 30% of patients and are frequently diagnosed incidentally during imaging studies obtained for other purposes.¹² However, 70% of patients

present with symptoms, the severity of which are related to the size of the cyst. Small cysts may simply cause abdominal pain, whereas large cysts may exert a mass effect and cause early satiety, nausea, vomiting, constipation, or hydronephrosis.^{2,3}

Patients with a suspected splenic cyst may have a palpable mass on physical examination, but often do not. Other causes of splenomegaly, including myeloid metaplasia, hemolytic anemia, mononucleosis, and portal hypertension must be excluded.¹³ Ultrasound and CT imaging may help to distinguish cystic from solid lesions and to characterize cyst loculations.² Posttraumatic cysts are usually unilocular, whereas parasitic cysts are usually multilocular.³ Serologic studies are useful to exclude a parasitic cause.

Although the natural history of secondary splenic cysts is not completely known, a risk exists of rupture, infection, or hemorrhage. Asymptomatic patients with small cysts (<5 cm) may be observed and usually do not require treatment. For symptomatic patients and for large cysts (>5 cm), surgical treatment is indicated. Historically, the treatment of choice for NPSCs has been total splenectomy. Although splenectomy may be indicated for patients with parasitic cysts, spleen-sparing techniques have evolved as the treatment of choice for NPSCs so that the risk of OPSI may be avoided. The incidence of OPSI is 3.3% to 4.4% among children and 0.9% to 3.2% in adults, with mortality ranging from 0.8% to 4.4%.^{14,15} The organisms most frequently associated with OPSI are *Streptococcus pneumoniae*, *Neisseria meningitidis*, *Escherichia coli*, and *Haemophilus influenzae*, and vaccinations should be administered.^{14,16}

Spleen-sparing techniques, such as percutaneous drainage with or without injection of a sclerosing agent, have been described but result in a high rate of recurrence.^{17–19} On the other hand, partial splenectomy and marsupialization via an open approach have proven effective.^{20,21} Laparoscopic approaches for both techniques have recently proven feasible and result in less postoperative morbidity.^{3,22,23} For our patient, a partial splenectomy was unnecessary because the cyst was broad-based and amenable to unroofing. For deeply seated, narrow-based cysts, a hemisplenectomy may be indicated to prevent recurrence.

CONCLUSION

Nonparasitic splenic cysts are rare lesions but may be associated with significant symptoms. Laparoscopic marsupialization is safe and effective, and is feasible even for

giant cysts, as described in this paper. In the current era, a laparoscopic spleen-sparing technique should be considered the treatment of choice.

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